

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A sharpening unit to sharpen a disk-shaped cutting blade ~~(19)~~ with a bevel ~~(205)~~ with a continuous circular cutting edge ~~(203)~~, comprising a first grinding wheel ~~(81)~~ and a second grinding wheel ~~(83)~~ acting on a first side ~~(207)~~ and on a second side ~~(209)~~ of said bevel ~~(205)~~, ~~characterized in that, wherein~~ said first grinding wheel ~~(81)~~ has a finer grain than said second grinding wheel ~~(83)~~; ~~the inclination of~~ said first grinding wheel has an inclination ~~is~~ such that when the unit is in operation, said first grinding wheel is placed against the first side ~~(207)~~ of the blade ~~with a slightly greater bevel at an inclination greater~~ than the inclination of the first side, in respect ~~of to~~ a lying plane ~~(PG)~~ of ~~the a~~ cutting edge of the blade, while ~~the inclination of~~ said second grinding wheel ~~(83)~~ has an inclination which is substantially parallel to the second side ~~(209)~~ of said bevel, and said second grinding wheel is constructed and arranged ~~and designed~~ to sharpen the ~~cutting~~ bevel of the blade, while said first grinding wheel is constructed and arranged ~~and designed~~ to apply a reaction force to said blade to prevent or reduce flexure of the blade in ~~the a~~ sharpening area and

eliminating ~~any~~ burrs produced by the second grinding wheel from the cutting edge.

2. (Currently Amended) Sharpening unit as claimed in claim 1, ~~characterized in that~~ wherein said first grinding wheel and said second grinding wheel are provided with a movement to move towards and away from the blade according to a direction essentially parallel to ~~their~~ axes of rotation of the first grinding wheel and the second grinding wheel.

3. (Currently Amended) Sharpening unit as claimed in claim 2, ~~characterized in that~~ wherein the movement to move said first grinding wheel and said second grinding wheel towards the blade is controlled so that the first grinding wheel comes into contact with the first side of the ~~blade~~ bevel before the second grinding wheel comes into contact with the second side of the ~~blade~~ bevel, and moves out of contact with said first side of the ~~blade~~ bevel after the second grinding wheel has moved out of contact with the second side of the ~~blade~~ bevel.

4. (Currently Amended) Sharpening unit as claimed in claim 3, ~~characterized in that~~ wherein the movement to move the first grinding wheel and said second grinding wheel ~~wheels~~ towards and away from the blade is controlled so that the first grinding wheel moves out of contact with the first

side of the ~~blade~~ bevel after said blade has made at least one turn around its axis subsequent to the second grinding wheel moving away from the second side.

5. (Currently Amended) Sharpening unit as claimed in ~~one or more of the claims from 1 to 4, characterized in that~~ claim 1, wherein said first grinding wheel and said second grinding wheel are motorized.

6. (Currently Amended) Sharpening unit as claimed in ~~one or more of the claims from 1 to 5, characterized in that~~ claim 1, wherein the ~~inclinations~~ inclination of each said first grinding wheel and said second grinding wheel are equal and opposite in respect ~~of a~~ to the lying plane of the cutting edge of the blade; said lying plane being essentially orthogonal to the axis of rotation of the blade.

7. (Currently Amended) Sharpening unit as claimed in ~~one or more of the claims from 1 to 6, characterized in that~~ claim 1, wherein said first grinding wheel has ~~an extremely~~ a fine grain ~~of~~ of from 7 to 46 according to ISO standards, ~~and preferably around 7.~~

8. (Currently Amended) Sharpening unit as claimed in ~~one or more of the claims from 1 to 7, characterized in that~~ claim 1, wherein said second grinding wheel has a fine grain ~~of~~ of between 45 and 91 according to ISO standards ~~and preferably between 70 and 80.~~

9. (Currently Amended) A cutting machine to cut rolls of wound web material, comprising:

- at least ~~a~~ one disk-shaped blade ~~(19)~~ rotating around an axis of rotation ~~[(B-B)]~~ and having a cutting bevel ~~(205)~~, with a continuous cutting edge ~~(203)~~, ~~defined by~~ with a first side ~~(207)~~ and ~~by~~ a second side ~~(209)~~, the first side having a greater radial extension than the second side, and at least said first side having a surface hardening treatment;

- at least ~~a~~ one sharpening unit ~~(80)~~ for said blade, with at least a first grinding wheel ~~(81)~~ acting on said first side ~~(207)~~ and a second grinding wheel ~~(83)~~ acting on the second side ~~(209)~~;

~~characterized in that:~~ wherein said at least one sharpening unit is produced according to ~~one or more of the claims from claim 1 to 8.~~

10. (Currently Amended) Cutting machine as claimed in claim 9, ~~characterized in that~~ wherein the inclination of the first grinding wheel ~~(81)~~ in respect of the first side ~~(207)~~ of the bevel and ~~the~~ thickness ~~(T)~~ of said surface hardening treatment allow the cutting edge ~~(203)~~ of the blade to remain within the thickness that has been subjected to hardening treatment.

11. (Currently Amended) Cutting machine as claimed in claim 9 ~~or 10, characterized in that,~~ wherein said first grinding wheel and said second grinding wheel are equipped with a movement to move ~~them~~ each towards and away from the blade according to a direction essentially parallel to ~~their~~ a respective axis of rotation of said first grinding wheel and said second grinding wheel, said movement also recovering wear on the blade caused by successive sharpenings.

12. (Currently Amended) Cutting machine as claimed in ~~one or more of the claims from 9 to 11, characterized in that~~ claim 9, wherein the ~~inclinations~~ inclination of each said first grinding wheel and said second grinding wheel are equal and opposed in respect ~~of a~~ to the lying plane ~~(PG)~~ of the cutting edge ~~(203)~~ of the blade ~~(19)~~, said lying plane being essentially orthogonal to the axis of rotation ~~[[B-B]]~~ of the blade, and ~~in that~~ wherein the ~~inclinations~~ inclination of ~~each first said side and said second side~~ of the bevel (205) of the blade are different in respect ~~of~~ to the lying plane ~~(PG)~~ of the cutting edge of the blade, the first side ~~(207)~~ having, in respect ~~of~~ to said lying plane, a lesser inclination than the second side ~~(209)~~.

13. (Currently Amended) Cutting machine as claimed in ~~one or more of claims 9 to 12, characterized in that~~ claim 9, wherein said first side ~~(207)~~ is substantially parallel to the lying plane ~~(PC)~~ of the cutting edge of the blade.

14. (Currently Amended) Cutting machine as claimed in claim 12, ~~characterized in that~~ wherein the difference in inclination between said first side and said second side is at least 1° ~~and preferably between around 1.5° and around 2.5° .~~

15. (Currently Amended) Cutting machine as claimed in ~~one or more of the claims from 10 to 14, characterized in that~~ claim 10, wherein the thickness of said hardening treatment of said first side is equal to or greater than 30 micrometers ~~and preferably equal to or greater than 80 micrometers and even more preferably equal to or greater than 90 micrometers, and even more preferably equal to or greater than 100 micrometers.~~

16. (Currently Amended) Cutting machine as claimed in ~~one or more of the claims front 9 to 15, characterized in that~~ claim 9, wherein at least said first side of the blade bevel has a surface hardness greater than 70 HRC ~~and preferably equal to or greater than around 72 HRC.~~

17. (Currently Amended) Cutting machine as claimed in ~~one or more of the claims from 9 to 15, characterized in that~~ claim 9, wherein said blade is made of alloy steel.

18. (Currently Amended) Cutting machine as claimed in ~~one or more of claims 9 to 17, characterized in that~~ claim 9, wherein at least said first side has a surface treatment obtained by penetration of molecules or atoms within ~~the~~ structure of ~~the~~ a base material forming the blade.

19. (Original) Cutting machine as claimed in claim 18, wherein said surface treatment is a controlled nitriding treatment.

20. (Currently Amended) Cutting machine as claimed in ~~one or more of claims 9 to 17, characterized in that~~ claim 9, wherein at least said first side has a surface treatment ~~consisting in~~ including a deposit of a material which is harder than ~~the~~ a base material forming the blade.

21. (Currently Amended) Cutting machine as claimed in ~~at least claim 17, characterized in that~~ claim 17, wherein said blade is made of chrome steel containing molybdenum.

22. (Currently Amended) Cutting machine as claimed in ~~one or more of the claims from 9 to 21, characterized in that~~ claim 9, wherein the inclination of said first side is equal to or less than 9° ~~and preferably equal to around 8°~~ in respect ~~of~~ to said lying plane ~~(PG)~~.

23. (Currently Amended) Cutting machine as claimed in ~~one or more of the claims from 9 to 22, characterized in that claim 9, wherein~~ said blade ~~(19)~~ has a body delimited by two planes ~~(201A, 201B)~~ essentially parallel to each other and essentially orthogonal to the axis of rotation ~~[[B-B]]~~ of the blade.

24. (Currently Amended) Method for sharpening a disk-shaped blade ~~(19)~~, to cut rolls of web material, comprising rotating around an axis of rotation ~~[[B-B]]~~ said blade having a cutting bevel ~~(205)~~, with a continuous cutting edge ~~(203)~~, defined by a first side ~~(207)~~ and ~~by~~ a second side ~~(209)~~, the first side having ~~a greater~~ an extension greater in a radial direction than the second side, and at least said first side having a surface hardening treatment; wherein a first grinding wheel ~~(82)~~ acts on said first side and a second grinding wheel ~~(83)~~ acts on said second side, ~~characterized in that: wherein~~

- said first grinding wheel ~~(81)~~ has a finer grain than said second grinding wheel ~~(83)~~;

- said first grinding wheel ~~(81)~~ is placed against the first side ~~(207)~~ of the blade ~~with a slightly greater bevel at an inclination greater than the an~~ inclination of the first side, in respect ~~of~~ to a lying plane ~~(PG)~~ of the cutting edge of the blade;

- said second grinding wheel ~~(83)~~ is placed against the second side of the ~~blade with~~ bevel at an inclination essentially corresponding to the inclination of said second side in respect ~~of~~ to said lying plane;

- wherein said second grinding wheel sharpens the cutting bevel, while said first grinding wheel applies a reaction force to said blade to prevent or reduce flexure of the blade in ~~the~~ a sharpening area and eliminates ~~any~~ burrs produced by the second grinding wheel from the cutting edge.

25. (Currently Amended) Method as claimed in ~~claims~~ ~~24, characterized by~~ claim 24, further comprising using a blade whose surface hardening treatment has a thickness of at least 30 micrometers ~~and preferably equal to or greater than 80 micrometers and even more preferably equal to or greater than 90 micrometers and even more preferably equal to or greater than 100 micrometers.~~

26. (Currently Amended) Method as claimed in ~~claims~~ ~~24 or 25, characterized in that~~ claim 25, wherein the inclination of the first grinding wheel ~~(81)~~ in respect ~~of~~ to the first side ~~(207)~~ of the bevel and the thickness of said hardening treatment are such that the cutting edge ~~(203)~~ of the blade ~~(19)~~ remains within the ~~thickness~~ thickness ~~interested~~ by of the hardening treatment.

27. (Currently Amended) Method as claimed in ~~one or more of the claims from 24 to 26, characterized in that~~ claim 24, wherein said first grinding wheel and said second grinding wheel are motorized.

28. (Currently Amended) Method as claimed in ~~one or more of the claims from 24 to 278, characterized in that~~ claim 24, wherein said first grinding wheel and said second grinding wheel are moved against said blade with a movement essentially parallel to ~~the~~ a respective axis of rotation, said movement also recovering wear of the blade caused by successive sharpenings.

29. (Currently Amended) Method as claimed in claim 28, ~~characterized in that~~ wherein the first grinding wheel comes into contact with the first side of the ~~blade~~ blade bevel before the second grinding wheel comes into contact with the second side ~~(209)~~ of the ~~blade~~ blade bevel; and ~~in that~~ wherein the first grinding wheel moves out of contact with said first side of the ~~blade~~ blade bevel after the second grinding wheel has moved out of contact with the second side of the ~~blade~~ blade bevel.

30. (Currently Amended) Method as claimed in claim 29, ~~characterized in that~~ wherein the movement to move the first grinding wheels wheel and the second grinding wheel towards and away from the blade is controlled so that the

first grinding wheel moves out of contact with the first side of the ~~blade~~ bevel after said blade has made at least one turn about its axis subsequent to the second grinding wheel moving away from the second side.

31. (Currently Amended) Method as claimed in ~~one or more of the claims from 24 to 30, characterized in that~~ claim 24, wherein the inclinations inclination of each said first grinding wheel and said second grinding wheel (83) are equal and opposed in respect of a lying plane of the cutting edge (203) of the blade (19), essentially orthogonal to the axis of rotation [(B-B)] of the blade, and in that wherein the inclinations inclination of each said first side and said second side two sides (207, 209) of the bevel (205) of the blade in respect of the lying plane (PG) of the cutting edge of the blade are different, the first side being less inclined less in respect of said lying plane than the second side, and in that wherein said first grinding wheels wheel and said second grinding wheel produce a symmetrical cutting edge in respect of the lying plane of the said cutting edge.

32. (Currently Amended) Method as claimed in claim 31, ~~characterized in that~~ wherein the difference in inclination between said first side and said second side is at least 1° and preferably between around 1.5° and around 2.5°.

33. (Currently Amended) Method as claimed in ~~one or more of the claims from 24 to 32, characterized in that it uses a~~ claim 24, wherein said first grinding wheel ~~with an extremely~~ has a fine grain[[,]] of from 7 to 46 according to ISO standards, ~~and preferably around 7.~~

34. (Currently Amended) Method as claimed in ~~one or more of the claims from 24 to 33, characterized in that it uses a~~ claim 24, wherein said second grinding wheel ~~with~~ has a fine grain[[,]] of from 45 to 91 according to ISO standards ~~and preferably from 70 to 80.~~

35. (Currently Amended) A disk-shaped blade to cut rolls of wound web material, comprising an axis of rotation [[(B-B)]], a body with flat parallel faces ~~(201A, 201B)~~ and a cutting bevel ~~(205)~~, with a continuous cutting edge ~~(203)~~, defined by a first side ~~(207)~~ and ~~by~~ a second side ~~(209)~~, the first side having, before sharpening, ~~a greater~~ an extension greater in a radial direction, and at least said first side having a surface hardening treatment; ~~characterized in that~~ wherein said surface treatment is a NITREG® treatment and has a thickness of at least 30 micrometers ~~and preferably of at least 80 micrometers and more preferably approximately equal to or greater than 90 micrometers and even more preferably equal to at least around 100 micrometers.~~

36. (Currently Amended) Disk-shaped blade as claimed in claim ~~37~~ 35, ~~characterized in that wherein~~ at least said first side has a surface hardness of over 70 HRC ~~and preferably equal to or greater than around 72 HRC.~~

37. (Currently Amended) Disk-shaped blade as claimed in claim ~~36 or 37~~, ~~characterized in that~~ 35, wherein said blade is made of alloy steel.

38. (Currently Amended) Disk-shaped blade as claimed in claim ~~39~~, ~~characterized in that it~~ 35, wherein said blade is produced in molybdenum chrome steel.

39. (Currently Amended) Disk-shaped blade as claimed in ~~one or more of claims 36 to 39~~, ~~characterized in that~~ claim 35, wherein at least said first side has surface thermal treatment by means of penetration of atoms or molecules within the structure of ~~the~~ a base material forming the blade.

40. (Currently Amended) Disk-shaped blade as claimed in claim ~~40~~, ~~characterized in that~~ 35, wherein the surface treatment is a controlled nitriding treatment.

41. (Currently Amended) Disk-shaped blade as claimed in ~~one or more of claims 36 to 39~~, ~~characterized in that~~ claim 40, wherein said surface treatment ~~consists in~~ includes a deposit of a material having a ~~higher~~ hardness

greater than the hardness of the a base material forming the blade.

42. (Currently Amended) Disk-shaped blade as claimed in ~~one or more of the claims from 36 to 42, characterized in that~~ claim 35, wherein said first side has, in respect of a lying plane ~~(PG)~~ of the cutting edge, ~~a lesser an~~ inclination less than the ~~other~~ second side.

43. (Currently Amended) Disk-shaped blade as claimed in claim ~~43, characterized in that~~ 42, wherein the first side is substantially parallel to the lying plane ~~(PG)~~ of the cutting edge of said blade.

44. (Currently Amended) Disk-shaped blade as claimed in ~~claim 43 or 44, characterized in that~~ claim 42, wherein the difference in inclination between said first and said second side is of at least 1° ~~and preferably between around~~ ~~1.5° and around 2° .~~

45. (Currently Amended) Disk-shaped blade as claimed in ~~claim 43 or 45, characterized in that~~ claim 42, wherein said first side has an inclination equal to or less than around 9° ~~and preferably equal to around 8°~~ in respect of said lying plane ~~(PG)~~.

46. (Currently Amended) Disk shaped blade as claimed in ~~one or more of the claims from 36 to 46, characterized in that~~ claim 35, wherein before sharpening said cutting edge

~~(203)~~ lies on a lying line ~~(PG)~~ that does not coincide with ~~the~~ a plane of ~~the~~ a center line ~~(PM)~~ of the blade and in respect of it the lying line is moved towards the first side ~~(207)~~.

47. (Currently Amended) Disk-shaped blade as claimed in ~~one or more of the claims from 36 to 47, characterized in that it~~ claim 35, wherein the blade has a body delimited by two planes ~~(201A, 201B)~~ essentially parallel to each other and essentially orthogonal to the axis of rotation $[(B-B)]$ of the blade.

48. (Currently Amended) Disk-shaped blade as claimed in ~~one or more of the preceding claims, characterized in that~~ claim 35, wherein the thickness of said treatment is such that the cutting edge of the blade, once sharpened by the first two grinding wheels wheel and said second grinding wheel contacting the ~~sides~~ first side and the second side of the cutting bevel, remains within the thickness of said treatment.